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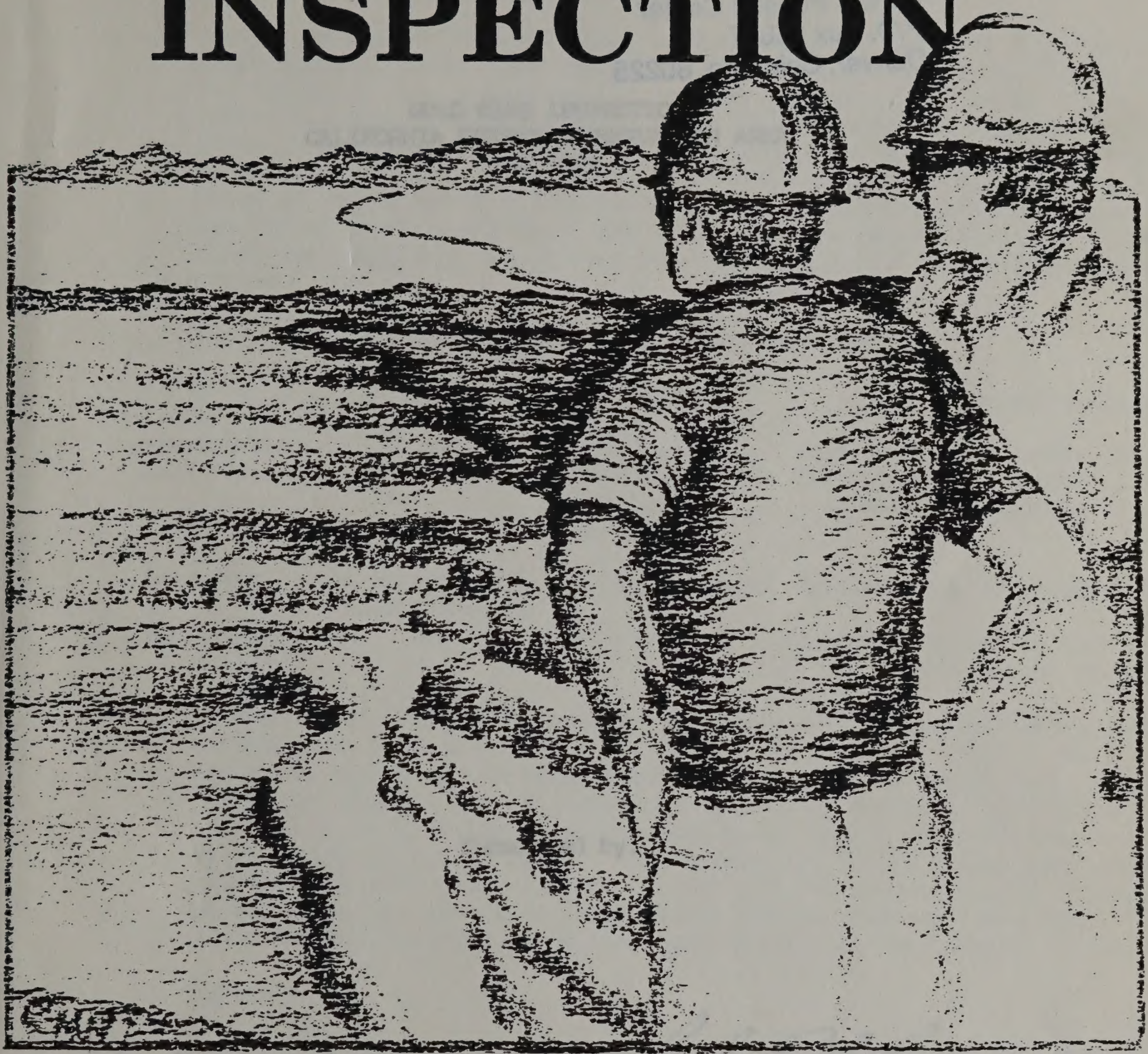
GOLD MINING INSPECTION



CALIFORNIA DESERT CONSERVATION AREA

MAY 1988

Attachment 1-1

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GOLD MINE INSPECTION
CALIFORNIA DESERT CONSERVATION AREA
MAY 1988

Submitted by:

Robert M. Anderson	Richard F Johnson
Robert M. Anderson Deputy State Director Mineral Resources	Richard F. Johnson Deputy State Director Lands & Renewable Resources

Gold Mine Inspection

California Desert Conservation Area

Introduction:

During the week of May 16, 1988, an inspection was made of four major producing gold mines, and two proposed gold mines in the California Deser The latter are to be operational in 1989. Three of the sites are in the Centro Resource Area (Goldfields Mesquite, Padre-Madre, American Girl) an three in the Needles Resource Area (Morning Star, Colosseum and Viceroy) Appendix 1 for mine statistics). A reconnaissance was also made of sever areas of the Panamint Mountains to review a small vat leaching project th has yet to produce any gold; and a few other projects where 3809 plans we filed 4-5 years ago, but little has been done except the maintenance of a cabins.

The following personnel were on the inspection team:

	Agency	Background	Present Position
Bob Anderson	BLM	Geologist	Deputy State Director, Mineral
Dick Johnson	BLM	Forester; Resources Planning	Deputy State Director, Lands Renewable Resources
Jim Pompy	CA Division of Mines & Geology	Mining Engineer	Mine Reclamation Program Manag
Hugh Riecken	BLM	Forester	Associate District Manager, California Desert District

In recent years there has been considerable exploration and development activity for disseminated and low grade gold deposits (.015 - .06), requiring sizeable open pits, leach pads or tailings ponds, and cyanide as a leaching agent. The California Desert has 19 operating gold mines and 7 proposed mines anticipated to be operational within the next 2-3 years on or partially on public lands. Gold production in the Desert has increased from about 5,000 ounces in 1980 to over 300,000 ounces in 1988. Over 1,30 mining operation proposals (exploration and development) have been submitted and reviewed since the regulations were implemented in 1981.

Purpose:

Eight years have passed since the 43 CFR 3809 regulations were implemented. There has been no formal evaluation of the effectiveness of the surface management program -- the program created by the 3802 and 3809 regulations.

There have been a few law suits filed and increasing concerns expressed by conservation groups alleging that BLM has not followed the regulations and that BLM promotes mining with little regard to environmental protection. With this in mind and because we have not formally conducted a review of the above nature, our purpose was to evaluate the effectiveness of:

1. 3809 regulations
2. Working relationship with BLM and other agencies

3. Protecting and mitigating the impacts of non-mineral resources
4. Public safety measures

Findings

1. Effectiveness of the 3809 Regulations

All of the four operating mines visited were authorized only after detailed mining plans were submitted and analyzed by BLM and county planning officials. Detailed environmental assessments were completed for each mining proposal and numerous stipulations were added and bonds required. An EIS is being done on the proposed Viceroy Mine.

The 3809 regulations have all the ingredients necessary to authorize and mitigate exploration and development operations. In fact, except for surface disturbance of less than five acres (mostly exploration), there is really no difference in the 3809 regulations than in other BLM regulations that provide for the exploration and extraction of a mineral resource.

Even for small operations of less than 5 acres, BLM has the authority and responsibility to prevent unnecessary degradation. The only thing we can not do is bond "Notice" operators.

All mines are visited by a number of agencies for compliance with their regulations. The frequency is not based on a regular schedule but rather, as time permits. BLM inspections were from once to twice every couple of months.

Recommendations

Re-evaluate the 3809 regulations to determine the feasibility of the following:

1. Mandatory bonding even for notices. Minimums (not less than $ x) should be stated in the regulations. A minimum of $100 cash bond for certain operations will provide for some increased compliance that may not be happening now.

2. Provide for a prospecting or exploration duration of 2 years. Failure to renew would close the case.

3. Provide for civil penalties.

4. Outline residency requirements - define diligence.

It would make good sense for all agencies connected with inspecting these mines to sit down together to determine if there are common areas of inspection items. Perhaps there could be a Memorandum of Understanding as to responsibilities and even a streamlining and reduction of costs by involved agencies and the industry. At a minimum there would be a better understanding of the needs by all concerned, which will lessen potential conflicts in the future. Until this happens, BLM inspections of these operations should be at least once a month.

1-4

2. Relationships with BLM and other permitting/regulatory agencies.

Officials of all six sites visited had high regard for the professionalism, efficiency and effectiveness of Bureau people with whom the worked. Bureau geologists, environmental staff, archaeologists, wildlife and plant specialists and managers were praised by the Compar Managers for their willingness to work together in solving problems. BLM staff often responded on short notice to mining operations changes An example of this was the quick response made by the El Centro Resour Area when the Goldfields operation needed to relocate its air quality monitoring stations.

Mining officials reported they saw State air and water quality inspectors on a frequent basis. In one operation, the Regional Water Quality Control Board monitors every one to two months, while the Air Quality Control District monitors quarterly.

Recommendations

See paragraph 1, Recommendations above.

3. Reclamation requirements.

Of the mines currently permitted and in operation, it was too early to tell whether reclamation requirements were either appropriate for the particular mining situation or were being carried out in accordance wi the mining plan. The two most obvious areas of concern in terms of surface disturbance are open pits and waste rock dumps.

When an ore deposit is mined by open-pit the resulting pit may be more or less conspicuous depending on geographical and geological circumstances. The ultimate depth and shape of the pit are dictated by the economics of mining and the geometry of the ore deposit rather than by particular reclamation goals. The very size of a large open pit would make backfilling, or even reshaping, an enormous economic burden of uncertain benefit, and inactive open pits could be reactivated if economic condition become favorable. Thus, in practical terms, reclamation of open pits is limited to planning for the placement of rock dumps and tailings ponds. Principles of landscape design can be appli at little additional cost in placing these materials in a manner that achieves beneficial postmining land use. 1/

In discussions with all mine operators it was apparent none of them regarded filling in of the open pits as a viable option. The reasons given were the high cost; the possibility of mining the same area in th future (lower grade ore may become more economic in the future); and th fact that placement of all tailings would not completely fill the mine

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1/ The entire paragraph was paraphrased from the Surface Mining of Non-Coal Minerals - A Study of Mineral Mining from the Perspective of the Surface Mining Control and Reclamation Act of 1977. National Academy o Sciences, 1979 p. 136

opening. Even at the Morning Star Mine, where reclamation will require filling all mine openings, it was apparent in our discussions they would be reluctant to do so. However, some backfilling was determined feasible at the Padre-Madre open pit and in accordance with their reclamation plans, some backfilling will be done. From a safety aspect steep sidewalls of open pit areas do create a potential safety hazard. There is an opportunity to be creative with these pits by using new reclamation techniques or through interpretive or educational opportunities.

Goldfields has contracted with the University of Arizona, Office of Arid Land Studies, for advice on accomplishing their reclamation. Emphasis is on reestablishing vegetation in disturbed areas and what to do with waste piles.

Recommendations

Each environmental document should determine the amount of surface disturbance by type, i.e., roads, open pits, leach pads, buildings, etc., and estimate the reclamation cost for each.

Each environmental document should analyze the feasibility of backfilling pits and clearly state the rationale why it can or cannot/should not be done. The aspect of human and wildlife safety should be considered.

Promote concurrent reclamation of disturbances to the extent possible.

The District Office should play a key role in sharing experience when new mines start up.

4. Cyanide use and hazards.

Cyanide solution is the only cost efficient chemical material to percolate through crushed gold ore and take the gold into solution. Most of the operations in the Desert are of the heap leach variety in which the cyanide is either sprinkled or slow-dripped onto the top layer of crushed ore. The heap leach operation requires drainage ditches and pipes to carry the cyanide solution to one or two collection ponds. The material is then pumped to a processing plant where the gold is extracted, and ultimately, a gold bar or Dore' is poured. The cyanide solution, after being recharged, is then recycled back onto the ore pads.

At the Colosseum mine the ore is crushed to a fine silt like material and mixed with cyanide in big tanks. This system never requires cyanide to be exposed to the open, and no animals can get to the cyanide laden tanks. There are tailings to deposit because of the initial grind (down to 200 mesh), but once the cyanide at 250 ppm takes the gold into solution the tailings are treated to destroy the cyanide and are piped to a tailings pond where the remaining cyanide measurement is about .1 ppm. In fact, the water in the tailings pond is potable once the mud settles to the bottom. Water is potable at .2 ppm cyanide and less.

In all operations the cyanide is handled in a very strict and formal manner as it can be hazardous if not handled properly. The solution on the leach pads ranges from about 135 to 300 ppm, and the collection ponds range from about 120 to 200 ppm.

1-6

Five areas of potential concerns were discussed in the use of cyanide in a heap leach operation. No concern was expressed about the system used at Colosseum.

Heap Leach Potential Concerns

1. Slumping or slipping of saturated and heaped ore pads.
2. Spraying vs. slow-dripping of cyanide onto the leach pad.
3. Animals being attracted to cyanide laden water.
4. Lack of reporting system for bird or other animal related deaths from drinking cyanide.
5. The public's lack of knowledge of cyanide and its use in this process and their fear of potential environmental damage.

Recommendations

Form a task group or panel of industry and BLM representatives to address these concerns and to make recommendations to BLM on what to require in the future for cyanide operations. We also need a fact sheet in the form of a questions and answers on all one ever wanted to know about the use of cyanide in mining operations. Experts at Dupont have agreed to do what they can in any attempts we make in educating the public on these issues.

5. Bonding

As can be seen from the table, the amount of bonding varies significantly, from $30,000 at the Morning Star Mine to a $1,000,000 letter of credit at the Colosseum Mine. While we would expect the amount of bond to vary with the type of mine operation, and with the acreage to be disturbed, the variation in amounts was questioned. The amounts are based upon Resource Area staff specialists estimates of reclamation costs.

In the instance of the Goldfields Mine, a bond is held jointly by BLM and Imperial County, with either party having access to it.

While we questioned the apparent low amount of bond for the Morning Star operation, time did not permit an in-depth independent assessment of its adequacy.

Recommendation

A task force comprised of California, Nevada, Arizona and the Washington Office should assess the criteria used to establish bonding levels, and report to these State Directors, on standardizing an approach to determining fair and adequate levels of bonding.

6. Environmental Staff

Only one mining operation (Colosseum) has an on-board person hired to monitor the environmental and conservation responsibilities. This is a part-time job for that person. While the other mines do not have this sort of staffing it appeared, through our questioning, that management was generally familiar with their plan of operation responsibilities. Goldfields, for example, has a program to train and keep employees aware of desert tortoise responsibilities. At the Morning Star Mine, management was positive about the effort they have made to relocate (transplant) certain plants.

Goldfields hires an independent firm to be its environmental "Auditor." The firm meets monthly with mine officials, on-site, to review, assess and discuss operations. The firm prepares an annual environmental audit of operations.

Recommendations

Encourage operators to hire on-site personnel or off-site consultants whose job would be strictly environmental. These folks could respond to all agencies responsibilities.

7. Sinking Fund For Reclamation

A sinking fund is a fund in which money would be set aside by the company on a regular basis for concurrent or end of operation reclamation. For example, for each ton extracted, x ¢ would be placed in an interest drawing account. If BLM were co-holders of the fund, bonding could be reduced or ultimately totally eliminated.

The companies were not receptive to this idea as they claim to have a better use of the money and the interest earned is not a good investment. Most of the companies visited are planning and presently account for reclamation in their monthly operating cost. This money is not put aside per se, for reclamation, but is accrued into their overall reserve for flexibility of use.

Recommendation

While there are some apparent drawbacks of a sinking fund there may be some advantages for companies establishing funds. One obvious advantage is the total up front commitment of funds to reclamation and the positive image portrayed to the public. BLM should, at least explore and encourage the use of a sinking fund, when new operations are proposed.

8. Image

We raised the question of image with reference to the perception by the public of both BLM and the mining industry, on how mining operations are authorized and carried out. We asked what opportunities do we have, working as a partnership (BLM and industry), to improve our image for good multiple use management.

1-8

There has been negative press attributed to both BLM and the industry because of mostly misinformed and uninformed writers. Our challenge is to educate and inform the public and media on mining exploration and development proposals, our regulatory process and mitigation of hazardous materials, including cyanide. All of the contacts of the sites visited agreed there is room for improvement. A couple of mines have an ongoing training program for their employees which include discussions of the non-mineral resources, especially sensitive and vulnerable resources. For example Goldfields has printed cards for each employee to carry on the handling of the Desert Tortoise should that become necessary in their day-to-day mining operations.

Colosseum has a similar Desert Tortoise awareness program. These training sessions are a valuable service to the employees and to public land resources.

Industry also has an opportunity to be more open with the public to explain why mining is needed and their efforts to put the land back to a productive use when mining is finished.

Recommendations

When new mines are opened encourage mine officials to erect an interpretive sign about the mine if it can be located so as not to become an attractive nuisance. The California State Office should assist in this design and the sign should include a line or two that indicates that public lands are involved and BLM's role in this approval.

Encourage industry to invite the media and environmental organizations to the mine site and show them what it takes to set a mine in production and their efforts to protect the environment.

Encourage industry to be more proactive in taking the lead on reclamation research especially for arid areas like the California Desert. Perhaps Goldfields could be assisted by other Desert companies in their work with the Office of Arid Land Studies.

BLM should continue with an early involvement of the public, especially the media and interest groups on the larger proposals or proposals involving sensitive resources or areas.

9. California's Surface Mining and Reclamation Act of 1975 (SMARA)

All of the operations visited are in compliance with SMARA. The operators are interested in meeting the objectives of SMARA (Reclamation) but have a concern that there needs to be a coordinated approach between BLM and the counties, who are defined as lead agency under SMARA. This coordination should eliminate duplication of permit processing and double bonding.

Recommendations

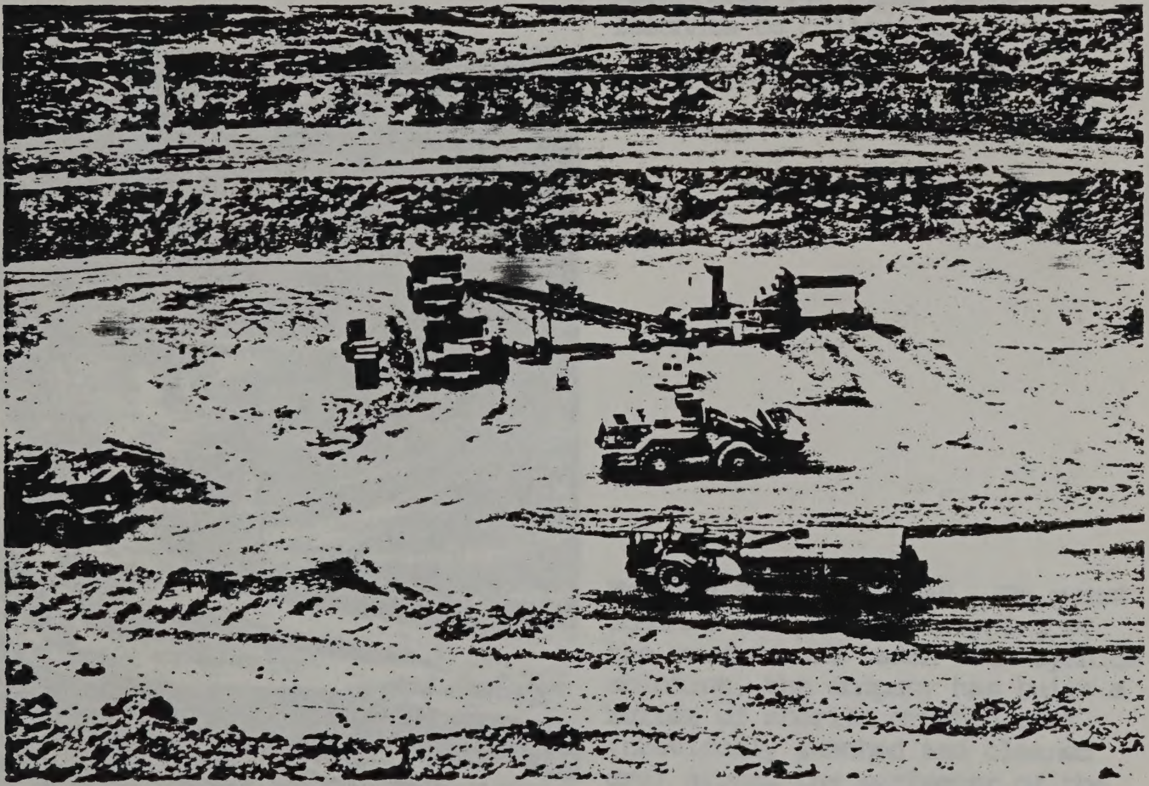
Actively participate in the current task force to develop a Memorandum of Understanding that will mitigate this concern.

Conclusions:

BLM officials have been responsive and diligent in their conduct to provide for mining within the realm of multiple use management and have been careful to fully mitigate anticipated environmental impacts of each operation. There is much to learn in approving mining operations of this magnitude and BLM is meeting this challenge. We can always improve however, and one way of doing so is to ask questions and to share information of others who have had the opportunity to work in the approval process. The District Office should consider a full-time position to work with developing new operations and to monitor them as they mine. The District should also play a key role in sharing mining experiences among Area Offices so as not to reinvent the wheel each time a new mine is proposed. We also found the overall attitude of the company officials towards BLM, the environment and, to the public lands, in particular, to be highly positive and appreciative. They want to do the right thing and be responsive to requests for reasonable mitigation that makes sense.

We also conclude that the effort expended to plan and execute this inspection, and to write this follow-up report, was worthwhile. These type of "third party" inspections should continue in the future.

One of Goldfields open pits. It was determined that backfilling was not viable.



Open pit at Padre-Madre - note water truck which keeps the haul roads moist for dust control. Dust control is standard procedure for mines visited. Blasted ore is crushed here and hauled to leach pads.

1-11

Padre-Madre leach pad. Ore is placed on rubberized lining. Perforated PVC pipes carry leachate to collecting ponds.

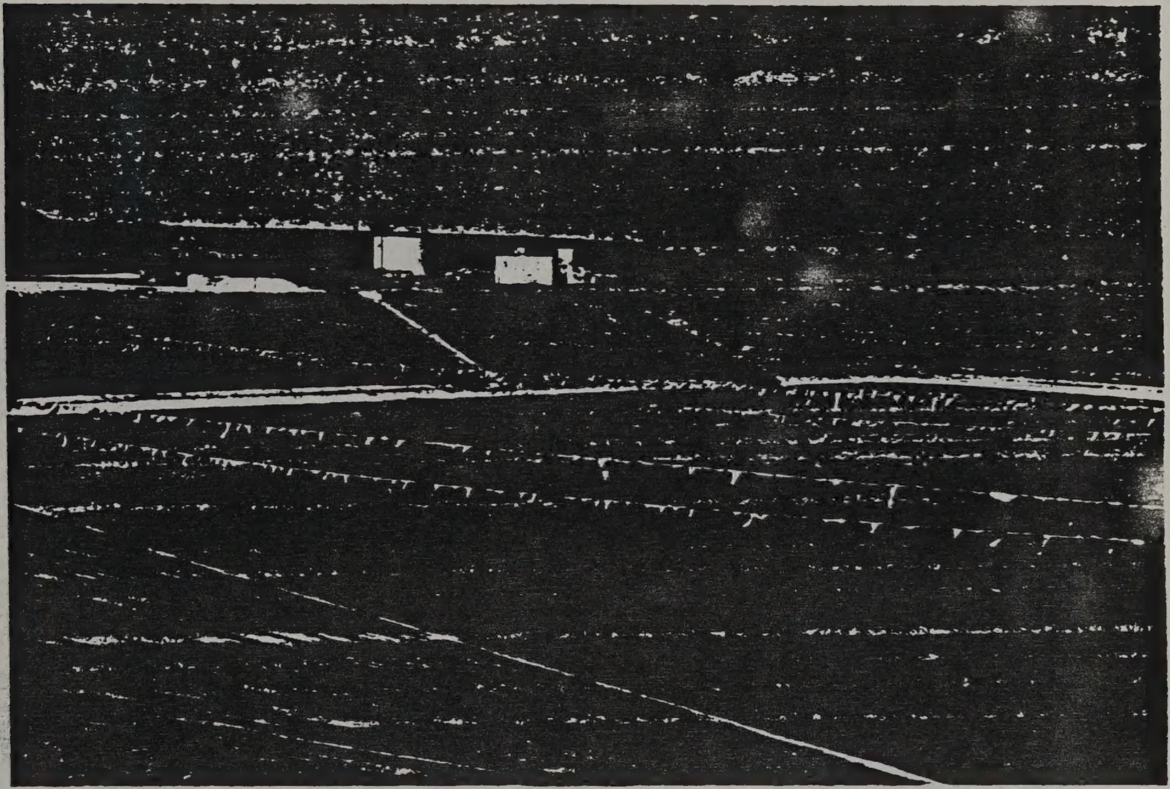
Morning Star leach pad. To guard against slumping or slipping of the crushed ore laden with cyanide solution, the company has built a buffer of sterile crushed rock (previously leached and cleaned ore) around the perimeter of the leach pad. The buffer extends from the visible rubber liner to the right about 50 feet.

1-12

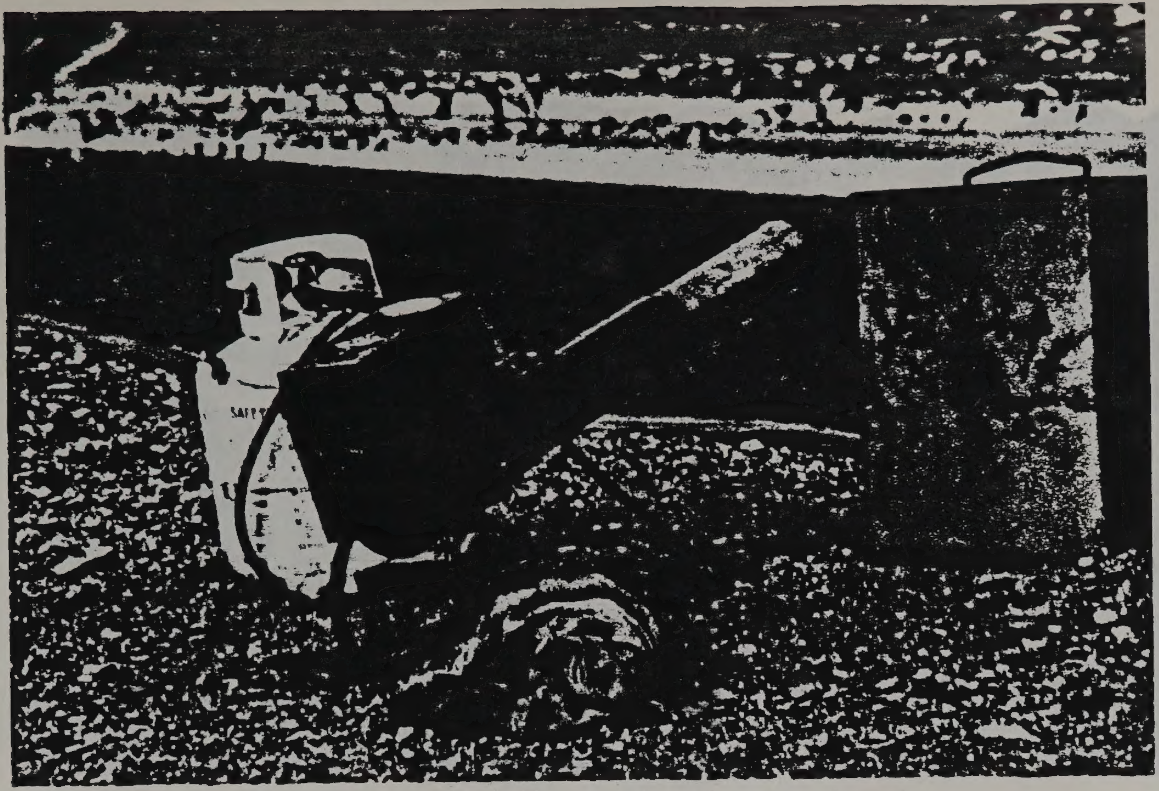
Padre-Madre Leach Pad showing drip system. Cyanide solution is ""dripped" rather than "sprayed" thus significantly reducing the evaporation of water and loss of cyanide.

Padre-Madre Leach Pad and drainage channel to carry gold laden cyanide solution to collecting pond. Channel is built to control possible slumping.

Goldfields Leach Pad and drainage channel to collecting pond.



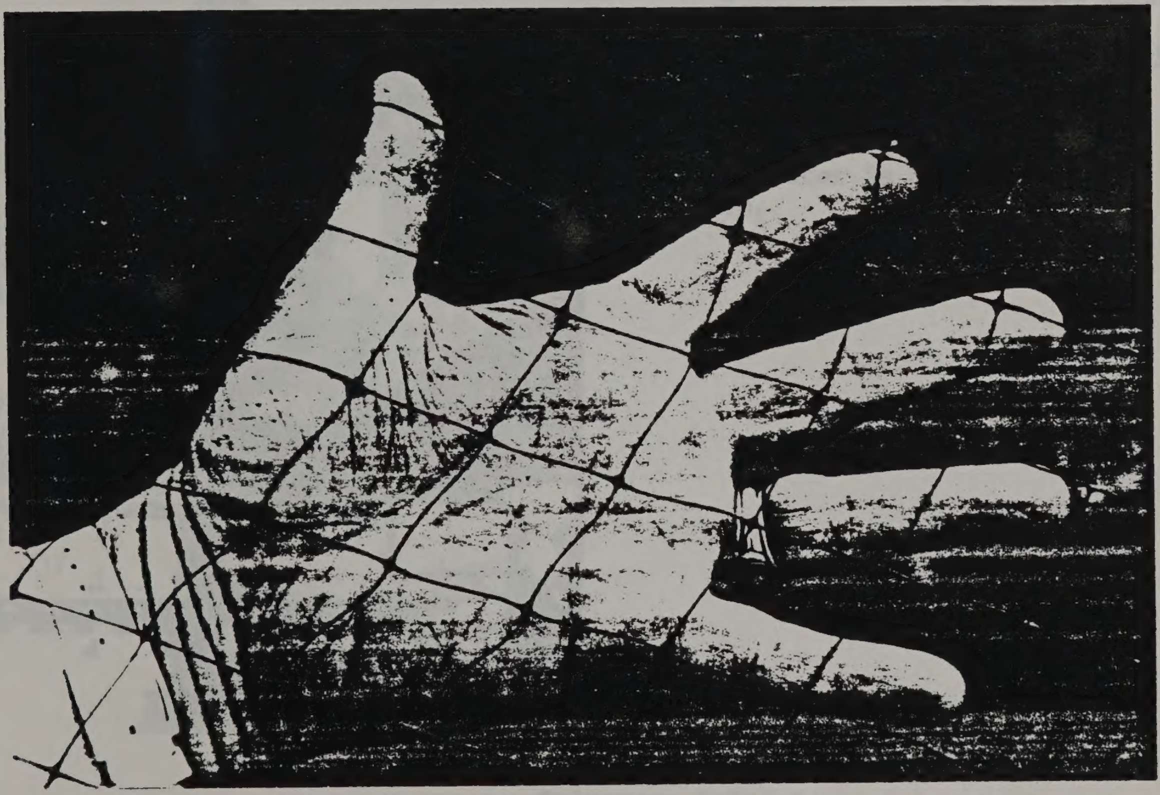
Goldfields Collecting Pond. Pregnant solution of gold bearing cyanide solution is pumped back to recovery tanks for ultimate pouring of gold bar. Flags are to keep birds out of ponds.



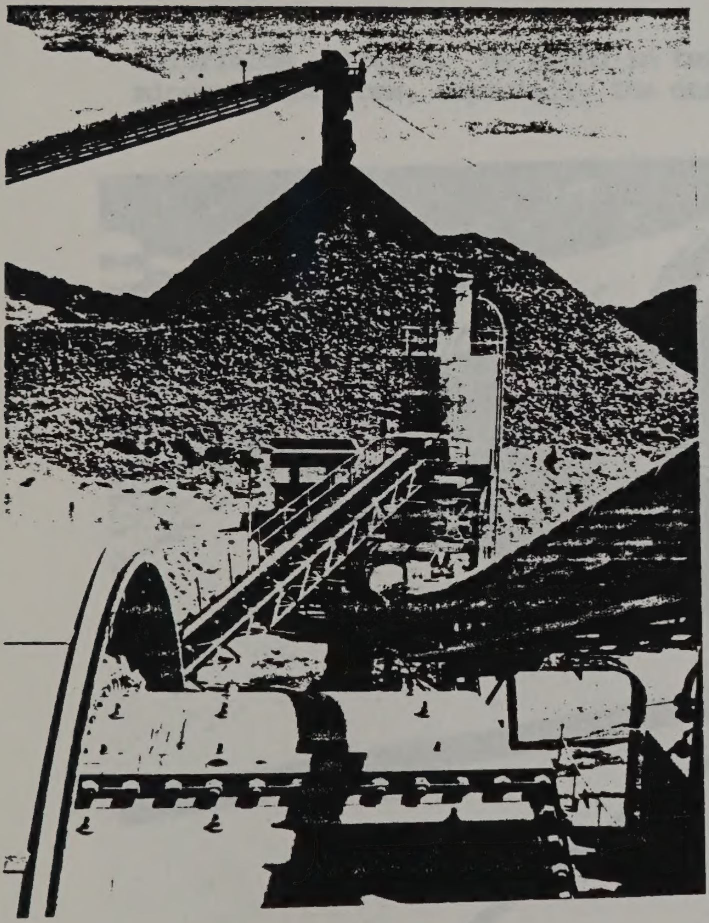
Zon guns at Goldfields fire a canon like blast about every 30 seconds around collecting ponds. This supplements the flags to keep the birds out.

Monitoring well at Morning Star in center of photo to ensure cyanide is not draining from pond. Note pond fence right of photo, and chain link fence across top of photo that surrounds the mining project area.

Collecting pond and gold recovery area at Padre-Madre. The carbon columns which strip the cyanide of gold can be seen in the background. Notice netting hung over pond to keep out birds and other wildlife.



Close-up of rubber base netting over pond above.

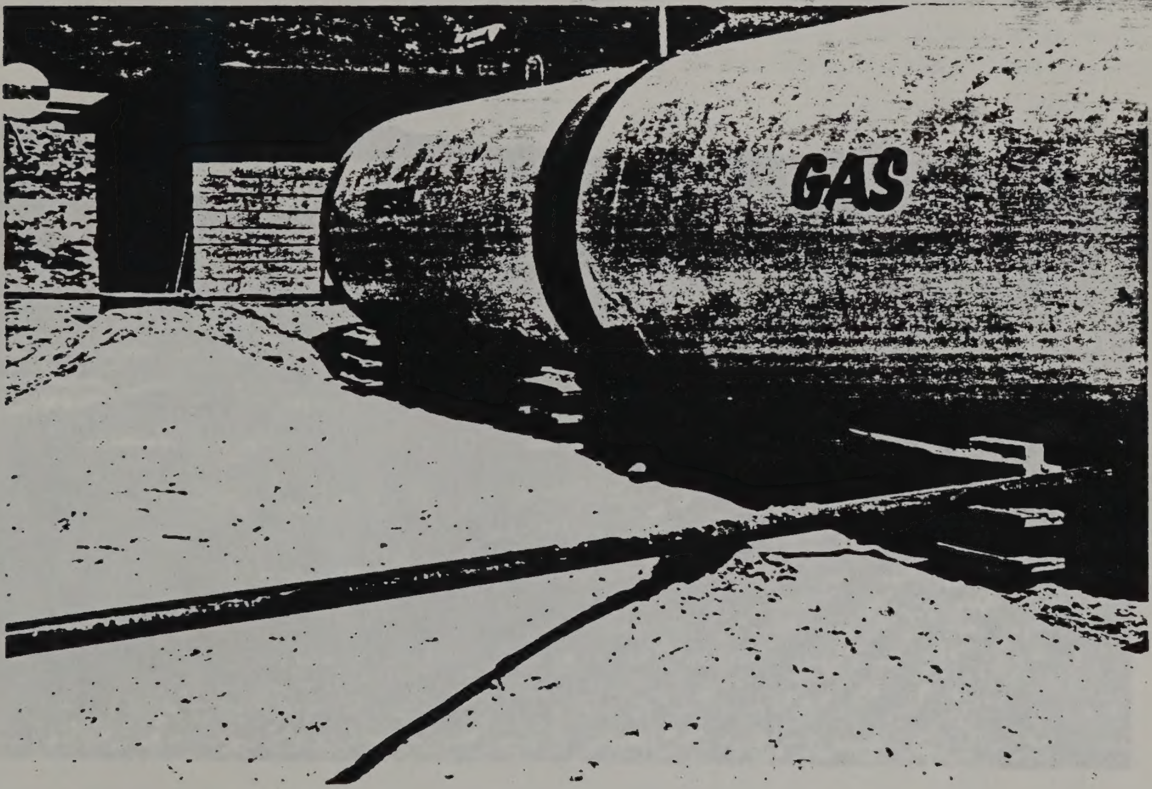


Colosseum Mine next to Clark Mountain. This is not a heap leach operation. Note the mill in center of photo where ore is crushed to a fine silt and mixed with cyanide in the big tanks seen behind the open water tank. Tailings from the mill are carried to the pond in the center of the photo. There is negligible cyanide carried to the pond. In fact the water is potable for wildlife.

Colosseum initial crush and ball mill (foreground) that takes the ore down to silt like size.

1-17

Goldfields entrance. As noted in text, companies are sensitive to non-mineral resources, especially the desert tortoise.

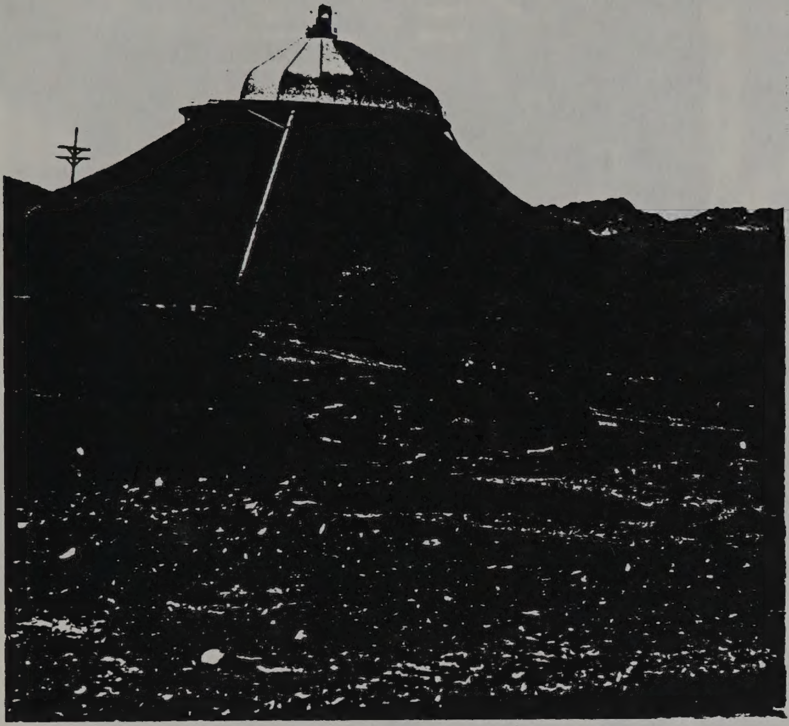


Fuel tanks at Morning Star. State law requires above ground placement or very tightly controlled underground monitoring, to ensure non-pollution of water resources.

1-18

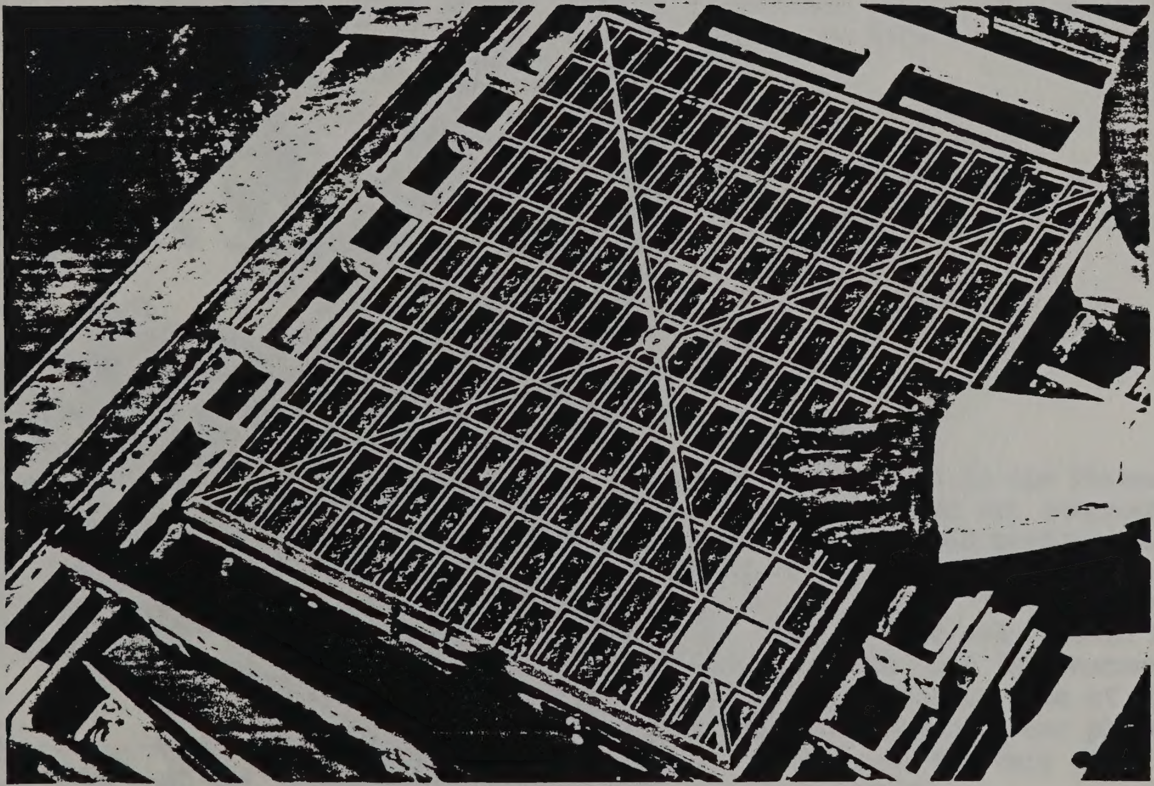
Goldfields needed borrow material for their re-routing of State Highway 78. Note the free flowing nature of the landscape and the preservation of vegetation - done at the suggestion of the El Centro Resource Area.

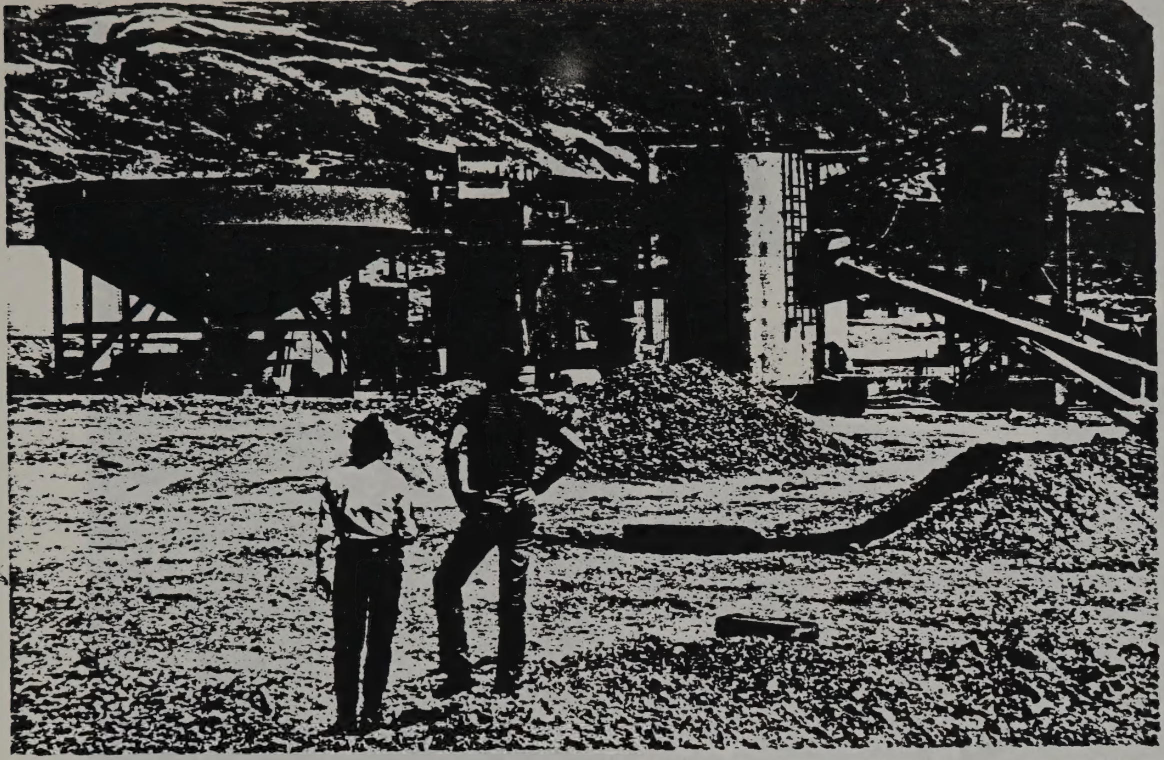
One of Goldfields waste dumps as seen from existing State Highway 78 before relocation of the highway. Goldfields has contracted with a firm to study how to make these dumps blend in with the natural landscape and/or start vegetation.



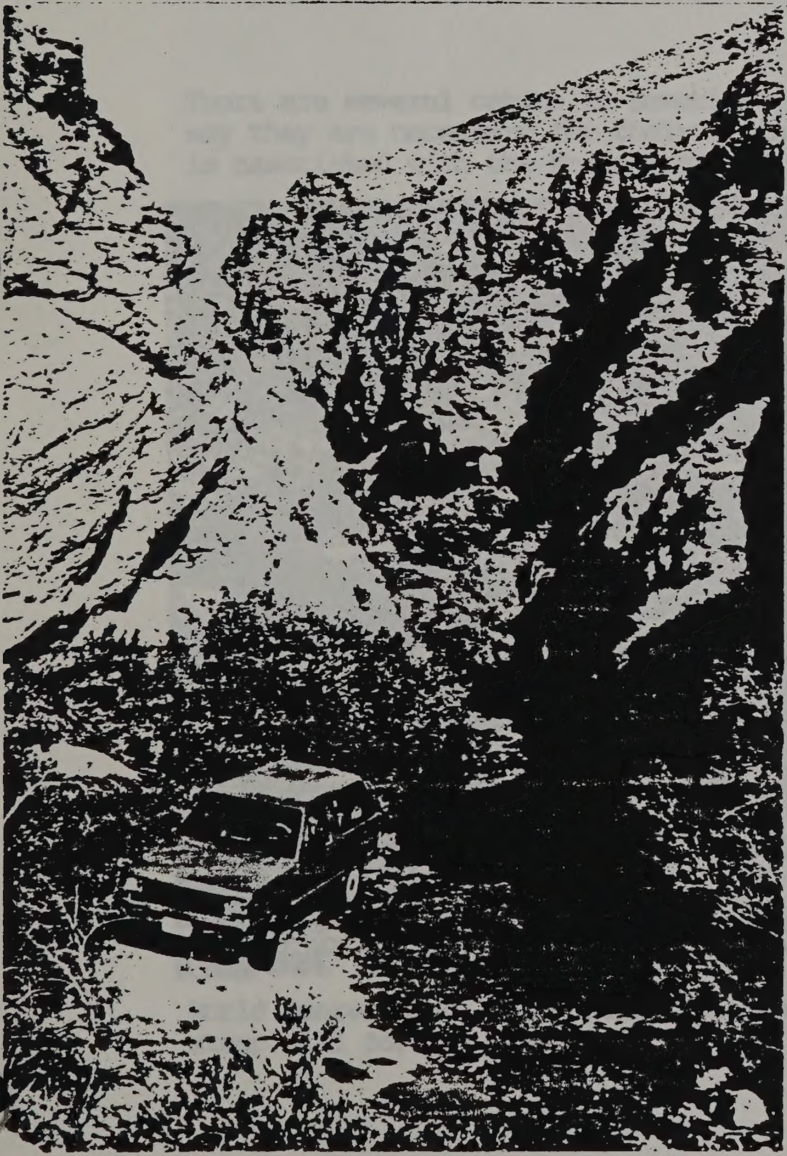
Dust control shelter over primary crusher at Goldfields. This has been very effective.

Bottom photo shows steel wool coated with gold via the electrowinning process. The next step is to melt the steel wool/gold in a furnace to make the gold bar.



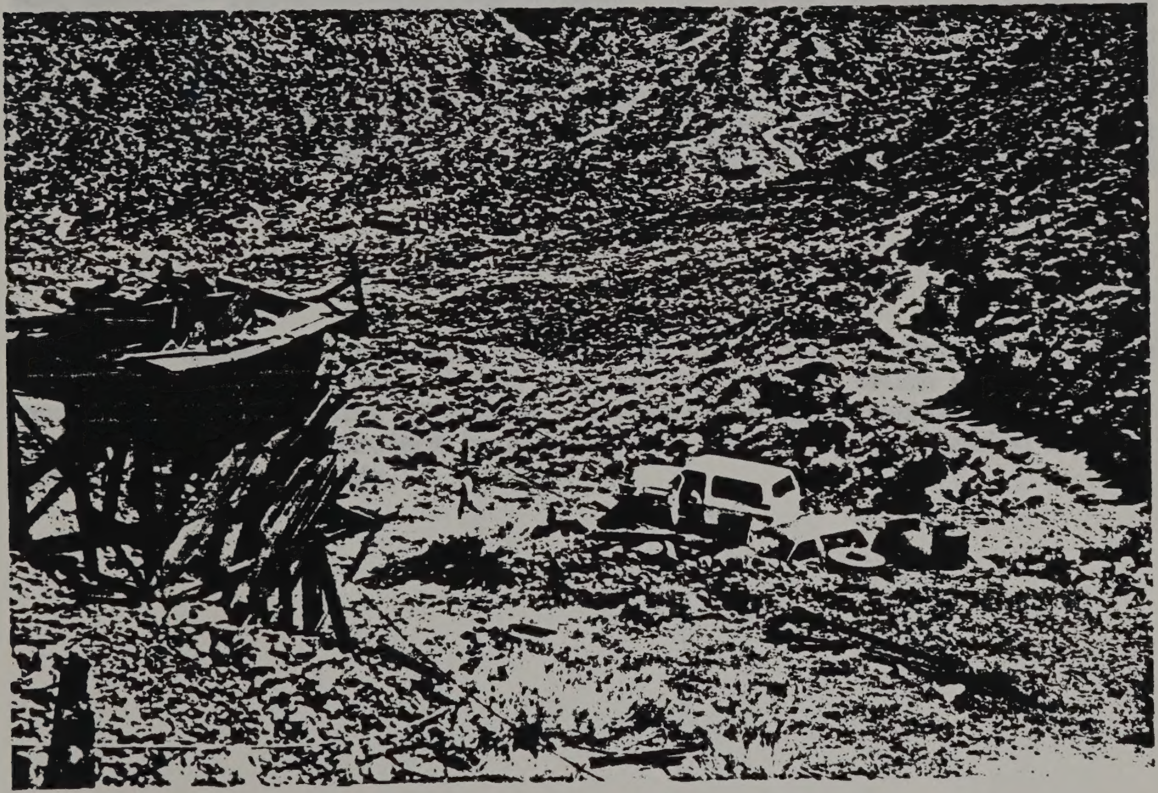


Vat leach operation by small miner on west slope of Panamint Mountains in the Ridgecrest Resource Area. Mining area and house trailers can be seen above vat. The mining claimant has apparently not been able to get the project off the ground. He is bonded for $10,000. Kerr-McGee geologists were taking samples on site the day we were there.



Beveridge Canyon in the Panamint Mountains. there are numerous claims in this old historic mining district. This is the main access to those claims. In a few places the road is just wide enough for a vehicle. The road is constantly being washed out because of the stream that has no other place to go. Note also the very good riparian habitat.

There are several cabins in Beveridge Canyon owned by mining claimants who say they are necessary for their mining operations. For example, this cabin is associated with the World Beater Mine that quit producing years ago.



World Beater Mine. Note stamps on ground that was originally part of the stamp mill for the mine.

Site of proposed Viceroy Gold Mine in the Old Mining District of Hart in the Needles Resource Area. This will be an open pit which will take up most of the center part of photo. Considerable controversy has been generated over this project because of the fear of contamination of ground water by cyanide.

1-23

MINES OR PROPOSED MINE SITES
Inspected, May 1988
Data as of May 27, 1988

	Bob Filler 619-352-6541 Goldfields Mesquite Mine	Joe Sawyer 602-344-3858 Eastmaque, American Girl Mining Corp. Padre-Madre Mine	Joe Sawyer 602-344-3858 Eastmaque American Girl Mining Corp., American Girl Mine 1/	Jack Jordan 702-362-3152 Vanderbilt Gold Corp Morning Star Mine	Mike Attaway (702) 367-3883 Bond Gold Collosseum, Inc	Harold Linder 602-839-9440 Viceroy Gold Co. Viceroy Mine 1/
- Section T&R	2, 133-19E	20, 15S-21E	17, 15S-21E	28, 15N-21E	10, 17N-13E	24, 14N-17E
- County	Imperial	Imperial	Imperial	San Bernardino	San Bernardino	San Bernardino
- Resource Area	El Centro	El Centro	El Centro	Needles	Needles	Needles
- Ownership (Country)	England	Canada	Canada	USA	Australia	Canada
- Ounces per year	180,000	18,000	45,000	about 25,000	75,000	100,000
- Average Ore Grade	.05	.04	.045	.056	.062	.055
- Life of Mine	20 years	10 years	10 years	8 years	10 years	10 years
- First Gold Bar Poured	1986	1987	1989	1985	1987	1989
- Type	Open-Pit Cyanide Heap Leach	Open-Pit Cyanide Heap Leach	Open Pit & Underground Cyanide, Heap Leach & Carbon in Pulp	Open pit, Cyanide, Heap Leach	Open Pit Carbon in Pulp	Open Pit, Cyanide Heap Leach
- Rank - Production Statewide						
- Number of Employees	260	30	15	70	120	150
- Total Acres to be Disturbed at End of Mining	2,200	204	242	150	450	698
- Bond or Equivalency	$500,000	$200,000	TBA	$30,000	$1,000,000 Ltr of Credit	TBA
- Present Fee Acres in Prjct Area	850	41	142	0	40	115
- Present Public Land Acres in Project Area	3,025	248	158	2,000	4,000	2,717
- EA or EIS	EA	EA	EA	EA	EIS	EIS
- Number of Open Pits	5 or 6	2	1	1, maybe 2	2	2
- Reclamation Funds Accounted for in Operating Cost	$200,000/year	?	?	$100,000 Total	5¢ per ton	7 - 21¢ per ton
- Total Tons to be Removed	325,000,000	16,000,000	25,500,000	32,000,000	50,000,000	86,000,000

I-24

1/ In Permitting Phase

Appendix 1

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
WASHINGTON, D.C. 20240

January 27, 1989

In Reply Refer To:
3809 (580)

EMS Transmission - 1/30/89
Instruction Memorandum No. 89- [illegible]
Expires: 9/30/90

To: All State Directors

From: Director

Subject: Request for Individuals to Participate in the Review of State Office Manual and Handbook Sections and Transmittal of Additional Information DD: 03/10/89

PROGRAM AREA: Mining Law Administration, Surface Management

ISSUE: (Two items)

FIRST ITEM: Review the report on gold mining operations produced by the California State Office and its suggestions in the context of the State's surface management program to identify any useful suggestions. Ensure that locally useful suggestions are incorporated into the State manual or handbook sections. Advise the Director of any useful suggestions for incorporation into the Bureau program manual or handbook section, as may be appropriate.

SECOND ITEM: Request for nominations for workgroup members to conduct a review of all State 3809 manual or handbook sections. The manual memo that requires any of the State Office draft manual or handbook sections to be completed no later than April 1, 1989. The Washington Office will not prepare an individual review of each handbook. All of the States' products will be evaluated at the same time, ensuring a consistent and consolidated review. This review will be done by a work group composed of Resource Area, District Office, State Office, and Washington Office personnel to be convened after the above date.

POLICY: The attached report does not establish new policies.

ACTION REQUIRED: (Two items)

FIRST ITEM: If the document contains observations that may be useful to your programs, consider them for inclusion in the State surface management manual or handbook sections. Send any comments on the report to the Director WO (580) and the California State Director (CA 940).

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
WASHINGTON, D.C. 20240

January 27, 1989

In Reply Refer To:
3809 (680)

EMS Transmission - 1/30/89
Instruction Memorandum No. 89- 237
Expires: 09/30/90

To: All State Directors

From: Director

Subject: Request for Individuals to Participate in the Review of State Office Manual and Handbook Sections and Transmittal of Additional Information DD: 02/10/89

PROGRAM AREA: Mining Law Administration, Surface Management

ISSUE: (two items)

FIRST ITEM: Review the report on gold mining operations prepared by the California State Office and its suggestions in the context of the State's surface management program to identify any useful suggestions. Ensure that locally useful suggestions are incorporated into the State manual or handbook sections. Advise the Director of any useful suggestions for incorporation into the Bureau program manual or handbook section, as may be appropriate.

SECOND ITEM: Request for nominations for workgroup members to conduct a review of all State 3809 manual or handbook sections. The annual work plan requires any of the State Office draft manual or handbook sections to be completed no later than April 1, 1989. The Washington Office will not prepare an individual review of each handbook. All of the States' products will be evaluated at the same time, ensuring a consistent and consolidated review. This review will be done by a work group composed of Resource Area, District Office, State Office, and Washington Office personnel to be convened after the above date.

POLICY: The attached report does not establish new policies.

ACTION REQUIRED: (two items)

FIRST ITEM: If the document contains observations that may be useful to your programs, consider them for inclusion in the State surface management manual or handbook sections. Send any comments on the report to the Director WO (680) and the California State Director (CA 920).

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Denver, Colorado 80225